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NIST Releases Rhode Island Nightclub Report

February 20, 2003, was to be a fun-filled evening at The Station in West Warwick, Rhode Island. As a band began to perform on the platform, stage pyrotechnics were used to enhance the festive atmosphere. Unfortunately, the pyrotechnics ignited the polyurethane foam insulation lining portions of the walls and ceiling of the platform and the fire raced along the ceiling and wall areas over the dance floor. In less than two minutes, the smoke filled the volume over the platform and dance floor, dropped to within two feet of the floor, and began to vent from exit doorways. Flames were observed breaking through the roof in less than five minutes. Egress from the non-sprinklered building was slowed down by crowding at the main entrance.

One hundred people lost their lives in the fire.

On February 27, 2003, NIST launched an investigation into the fire. There were four objectives of the investigation: To establish the likely technical causes of the building failure; to evaluate the technical aspects of the evacuation and emergency response procedures; to recommend, as necessary, specific improvements to building standards, codes, and practices based on the findings made pursuant to the duties listed above, and to recommend any research and other appropriate actions needed to improve the structural safety of buildings, and to improve evacuation and emergency response procedures, based upon the findings of the investigation.

As part of the investigation, NIST studied the polyurethane foam. A non-fire retarded foam sample purchased by NIST ignited within 15 seconds when exposed to a pyrotechnic device (see photo) in a experimental configuration similar to the setup on the nightclub's platform. (No foam samples from The Station were obtained by NIST for testing.)

Cont. on page 2



Still frame taken from video of full-scale mock-up experiments (unsprinklered) at 50 seconds.

PDA Hazmat Data for First Responders

When first responders arrive at a hazmat (hazardous materials) incident, they need to know exactly how hazardous a material or substance may be and what problems may develop as a result. The U.S. National Library of Medicine (NLM) has released a Personal Digital Assistant (PDA) software tool designed to help first responders gather that kind of information when they arrive at a hazmat incident such as a chemical spill.

The software tool, WISER (Wireless Information System for Emergency Responders) provides the emergency responder with critical information on hazardous substances such as the physical characteristics, human health data, and containment and suppression information for that substance. WISER was customized for easy navigation and quick access to critical information required by first responders.

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WISER displayed on PDA.

NIST Releases Rhode Island Nightclub Report, cont.



Still frame taken from video of full-scale mock-up experiments (sprinklered) at 50 seconds..

The nightclub platform area was reconstructed in NIST's large fire laboratory to examine, in a controlled environment, how the fire may have spread in a full-scale reconstruction of the nightclub, and to measure the temperature, heat flux, and gaseous products. During the test, it took less than 90 seconds after ignition of the foam in the drummer's alcove for conditions in the middle of the room, at head height, to be lethal.

In addition to full-scale and small-scale fire tests, computer simulations were also used in the investigation. As a result of this research, ten recommendations were made to improve building safety, evacuation and emergency response procedures.

These findings and recommendations available in the report, *Report of the Technical Investigation of The Station Nightclub Fire*,

by William Grosshandler, Nelson Bryner, Daniel Madrzykowski, and Kenneth Kuntz, NIST NCSTR2: Volume 1, and Volume 2: Appendices, which is available at:

http://www.nist.gov/public_affairs/releases/RI_finalreport_june2905.htm. For a DVD of the reports, contact Nelson Bryner via e-mail: nelson.bryner@nist.gov.

NIOSH/RAND Study for Protecting First Responders

To address concerns that were identified after the September 11, 2001, terrorist attacks, NIOSH and the Science and Technology Policy Institute (S&TPI) [formerly managed by the Rand Corporation] organized a

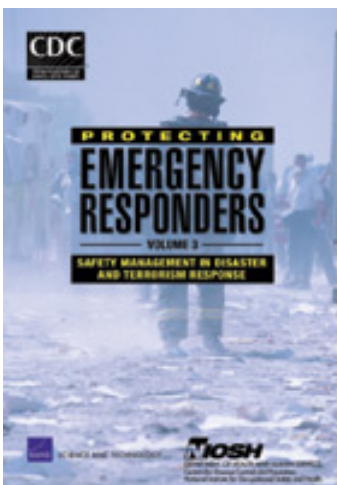
conference in New York City on the protective equipment needs when responding to terrorist incidents. During the conference, participants repeatedly identified the need for firefighters, emergency medical service responders, and law enforcement officers to have better protective equipment and more effective safety management so that they can bring emergency situations under control before they turn into disasters.

To meet these identified needs, NIOSH and S&TPI undertook a study to better understand safety management in major natural and manmade disasters. To obtain information, they conducted an extensive literature review, interviewed members

of the response community, and held a conference where representatives across the responder community discussed recommendations for improving safety management. The results of these efforts are included in the report, *Protecting Emergency Responders. Volume 3: Safety Management in Disaster and Terrorism Response*, by Brian A. Jackson, John C. Baker, M. Susan Ridgely, James T. Bartis, and Herbert I. Linn, released jointly by the Rand Corporation and NIOSH (National Institute for Occupational Safety and Health/Centers for Disease Control and Prevention/Department of Health and Human Services).

The report offers a comprehensive set of strategies and tactics for improving the safety of responders including preparation before an event and effective management afterwards.

To obtain a complimentary copy of this report, you may download it from <http://www.rand.org/publications/MG/MG170/>. Earlier reports in this series are also available: *Volume 1. Lessons Learned From Terrorist Attacks*, downloaded from <http://www.rand.org/publications/CF/CF176/> and *Volume 2: Community Views of Safety and Health Risks and Personal Protection Needs*, downloaded from <http://www.rand.org/publications/MR/MR1646/>.



Cover of Report.

Remembering the World Trade Center Disaster

The New York State Museum in Albany, N.Y. has opened a long-term exhibit, **The World Trade Center: Rescue Response Recovery**. The exhibit is divided into three parts: **Rescue** -- the first 24 hours after the attack as witnessed by Fire Department of New York's (FDNY) Engine Company 6

(they lost four firefighters in the towers collapse); **Recovery** -- the process of how over 10 months, 1.8 million tons of WTC debris were carefully sifted for clues, personal items, and human remains at Staten Island's Fresh Kills Landfill ("kills" is the Dutch word for small stream; the Dutch were

the first Europeans to settle in the New York City area); and **Response** -- people's reactions to the attacks throughout New York, the United States, and around the world.

The exhibit contains WTC artifacts, photographs, interactive computer stations,

and a motion picture. There are many items, large and small, that tell the story of the buildings and the recovery efforts, including such items found in the debris such as floppy disks, keys, destroyed street lampposts, fire hydrants.

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Remembering the World Trade Center Disaster, cont.

Also on exhibit are pieces of the airplanes that crashed into the WTC towers and a portion of a wheel assembly from one of the planes.

FDNY's Engine Company 6 was the first to respond. Their Engine Company was very close to the WTC, and their pumper was uniquely designed to push water to the top of the 110 story towers.

On display is the pumper (right), which was destroyed when the North Tower collapsed.

For those that cannot visit the museum in person, a web site showcasing the exhibit is available, <http://www.nysm.nysed.gov/wtc/>. The web site has the exhibit grouped into three categories: Gallery Images, Teacher Guides, and A Timeline at Ground Zero.



Pumper destroyed in the disaster.

PDA Hazmat Data for First Responders, cont.

To assist decision making, the user may specify the role they are currently performing at the scene of the incident. WISER then organizes the information in a sequence most relevant to that role - first responder, hazmat specialist or emergency medical specialist (EMS).

WISER can also help identify unknown substances. Using input about observed physical properties of the unknown substance, along with reported symptoms and observable signs among victims, WISER can assist the user by narrowing the range of substances that may be

involved in a specific incident. As the emergency responder selects observed properties and symptoms, WISER looks in its database for chemical substances that have these characteristics. As the user provides additional information, the list of suggested chemicals decreases. WISER presents the user with a list of candidate chemicals at any point in the identification process.

What do you need to run WISER? One of the following is needed: Pocket PC 2002 or Pocket PC2003 device with 15 megabytes of memory or Palm OS® PDA with version 3.5 or above and with 7.5

megabytes of memory, or Microsoft® based personal computer with a minimum of 17 megabytes of hard disk space and Microsoft® .NET framework. (If you do not have .NET framework, the installer will assist in downloading and installing it.)

A number of organizations, for example, Baltimore County (Maryland) Hazmat Team training program, the Illinois Fire Service Institute, and the Federal Emergency Management Agency's (FEMA) Chemical Stockpile Emergency Preparedness Program, have added WISER to their training curricula.

To obtain a free copy of WISER for PDAs or Windows desktop, it can be downloaded from <http://wiser.nlm.nih.gov>.

In addition, a Web-based version also is being developed and will be available by November 2005. By joining an automatic mailing list, users will be notified of important updates, some of which may be critical for the safe use of the information. (Joining the mailing list is optional.)

Radio Systems Safety Project – Phoenix Fire Department

The City of Phoenix (Arizona) contracted for a Digital Trunked Radio System to provide communications for all city departments including the Fire Department. Trunked radio systems may be used whenever a large number of mobile radios need to share radio frequencies.

In a trunked radio network, a large number of workgroups may share fewer channels because the trunking equipment dynamically allocates an available channel when users key their radio. Rather than communications being sent radio-to-radio, each radio sends signals to a nearby tower or receiver site, which then

rebroadcasts that transmission at higher power. The contracted system utilizes the APCO Project 25 standard, a non-proprietary digital format, thus allowing the use of portable and mobile radios from multiple manufacturers.

Although trunked radio systems allow efficient use of

the frequency spectrum, the **Phoenix Fire Department** questioned the application of trunked radio technology to firefighting. Testing was conducted to determine if the application of this technology was adequate to meet their needs.

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Phoenix Fire Department's Radio Systems Safety Project, cont.

In addition to the digital trunked radio technology, VHF Simplex, 700/800 MHz Analog Simplex, and 700/800 Digital Simplex radio systems were used to test the effectiveness of the radios. A total of approximately 1,500 talk paths were tested in 30 buildings that were representative of all fire construction types as classified by the National Fire Protection Association (NFPA). To ensure consistency in the grading process, the same test participants were used throughout the testing.

A team from the Electromagnetics Division, National Institute of Standards and Technology (NIST, Boulder), participated in the testing phase of radio signal measurements. The NIST measurements showed large signal variations, often greater than a factor of two, over the limited distance of a single floor in the structure. This information contradicts vendor claims that buildings within certain geographical areas should have specific decibel strengths in order to have

adequate in-building communications. The data collected by the Phoenix Fire Department demonstrated an overwhelming preference for analog (versus digital) modulation. In the analog mode, performance differences between the frequency bands appeared to be negligible. For this data set, digital modulation and trunked radios had a higher failure rate and the audio quality scored below the ratings in analog mode. To learn more about these and other recommendations found in the

report, go to <http://phoenix.gov/FIRE/radioreport.pdf>.



PFD Firefighter with Radio.

GSA Presents Firefighter Forcible Entry Training

Many new and recently renovated government facilities have windows that are specially designed to protect occupants from glass fragments and debris that may result from explosions, high winds, gun shots, physical attack, and other severe events. These special windows are generally harder to break than typical windows. This may cause some difficulties for an unsuspecting and unprepared occupant or firefighter attempting to vent or clear a window in the case of an emergency. In response, the U.S. General Services Administration (GSA) Public Building Service (PBS) sponsored the development of

training to make occupants and emergency responders aware of the special characteristics of security windows and to provide training in proper methods to ingress or egress through such systems.

The training presents background information on blast, hurricane, and ballistic resistant windows, along with methods and issues associated with clearing such windows. The web-based training is available to the public at <http://www.oca.gsa.gov/firefighter/index.php>. The website includes videos of firefighters using hand tools and power tools to vent and clear a wide variety

of windows. In addition the full report and a training manual are downloadable from the website. Students may evaluate their knowledge by taking the examination and are eligible for a certificate of training should they pass the test.

Since the training website was made available in July 2005, several hundred firefighters and other interested parties have taken the course and successfully passed the online examination. The need for such information was first identified by Mr. Willie Hirano of GSA's Region 10 in Auburn WA. Mr. Steven C. Smith GSA's Subject Matter Expert for Security

located in Washington DC facilitated the development of the on-line training and its distribution to the general public. For further information contact: Mr. Steven Smith at steven.c.smith@gsa.gov or Mr. Willie Hirano at willie.hirano@gsa.gov.



Image from training course.

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